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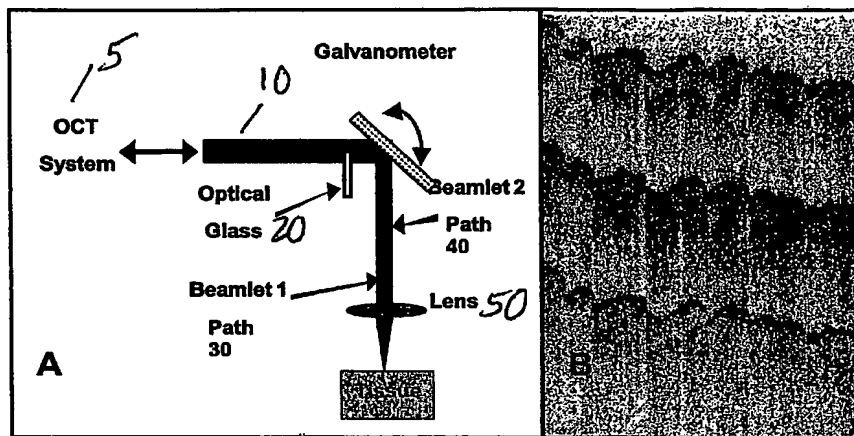
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(54) Title: SPECKLE REDUCTION IN OPTICAL COHERENCE TOMOGRAPHY BY PATH LENGTH ENCODED ANGULAR COMPOUNDING



(57) Abstract: Speckle, a factor reducing image quality in optical coherence tomography ("OCT"), can limit the ability to identify cellular structures that are important for the diagnosis of a variety of diseases. The present invention allows for an implementation of an angular compounding, angular compounding by path length encoding ("ACPE") for reducing speckle in OCT images. By averaging images obtained at different incident angles, with each image encoded by path length, ACPE maintains high-speed image acquisition and implements minimal modifications to OCT probe optics. ACPE images obtained from tissue phantoms and human skin in vivo demonstrate a qualitative improvement over traditional OCT and an increased signal-to-noise ratio ("SNR"). Accordingly, apparatus probe catheter, and method are provided for irradiating a sample. In particular, an interferometer may forward forwarding an electromagnetic radiation. In addition, a sample arm may receive the electromagnetic radiation, and can include an arrangement which facilitates a production of at least two radiations from the electromagnetic radiation so as to irradiate the sample. Such arrangement can be configured to delay a first radiation of the at least two radiations with respect to a second radiation of the at least two radiations.

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